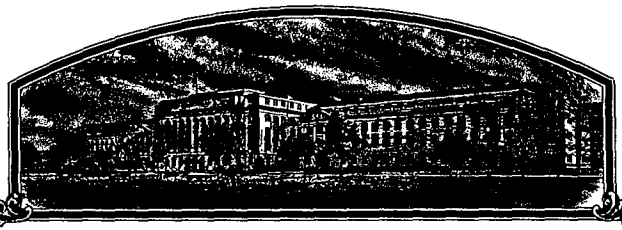
No. 8700020



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Holden's Foundation Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY) AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'LH52'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D. C. *this* 29th *day of* May *in the year of our Lord one thousand nine hundred and* eighty-seven.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng
Secretary of Agriculture

APPROVAL EXPIRES 4-30-85

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
Holden's Foundation Seeds, Inc.	Ex1006	LH52

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*	5. PHONE *(Include area code)*	FOR OFFICIAL USE ONLY PVPO NUMBER
R.R.#2, P.O. Box 839 Williamsburg, IA 52361	319-668-1100	8700020

6. GENUS AND SPECIES NAME	7. FAMILY NAME *(Botanical)*	FILING: DATE / TIME
Zea Mays	Gramineae	November 19, 1986 2:00 ☐ A.M. ☑ P.M.

8. KIND NAME	9. DATE OF DETERMINATION	FEES RECEIVED: AMOUNT FOR FILING / DATE
Corn, Field	November 1984	$ 1800.00 November 19 1986

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*	FEES RECEIVED: AMOUNT FOR CERTIFICATE / DATE
Corporation	$ 200 00 April 29, 1987

11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION
Iowa	1968

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Mr. Mark Armstrong
P.O. Box 839
Williamsburg, IA 52361

PHONE *(Include area code)*: 319-668-1100

14 CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☐ Yes *(If "Yes," answer items 16 and 17 below)* ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ Yes ☒ No	☐ Foundation ☐ Registered ☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES ?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Arnold Holden	11/17/86
SIGNATURE OF APPLICANT	DATE
	1

FORM WA-470 (7-84) (Edition of 3-84 is obsolete.)

INSTRUCTIONS

General: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and $1,800 fee *($200 filing fee and $1,600 examination fee)* to U.S. Department of Agriculture, Agricultural Marketing Service, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. *(See section 180.175 of the Regulations and Rules of Practice.)* Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

Item

9 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.

14a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.

14b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.

14c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.

14d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.

14e Section 52(4) of the Plant Variety Protection Act requires applicants to furnish a statement of the basis of the applicant's ownership. The applicant may be the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

15 If "Yes" is specified *(seed of this variety be sold by variety name only as a class of certified seed)* the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "No," he may change his choice. *(See section 180.16 of the Regulations and Rules of Practice.)*

19 See section 41 (i, j) and 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice for eligibility requirements.

* Furnish only untreated seed with your application. The Plant Variety Protection Office has no approved facilities to safely handle treated seed.

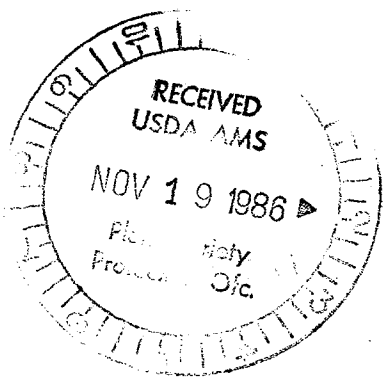


Exhibit A

'LH52' was developed through a pedigreed system of breeding. On the following page is a schematic description of the development of 'LH52'. Also included are copies of pages from Holden's Foundation Seeds nursery books. The rows associated with the development of 'LH52' have been highlighted.

Attached also is a statement from the originating plant breeder, Art Johnson, Holden's Foundation Seeds and Tom DeCourcy, plant breeder, Holden's Foundation Seeds stating that the line 'LH52' is uniform, stable and free of variance the last three generations of increase.

Exhibit A

Origin Breeding History of the Inbred

LH52=Ex1006=610 x Mo17)3

Row	Pedigree	Location	Level of Inbreeding	Year
3172-3175	Mo17(610 x Mo17)	Hawaii	Backcross	1978
13161	Mo17(610 x Mo17)	Iowa	Backcross	1978
2430-2434	Mo17(610 x Mo17)Mo17	Hawaii	Self Poll.	1979
2678	Mo17(610 x Mo17)Mo17⊠1	Iowa	⊠1	1979
2460	Mo17(610 x Mo17)Mo17⊠1	Iowa	⊠2	1980
783	610 x Mo17)3⊠3	Iowa	⊠3	1981
5264	610 x Mo17)3⊠4	Hawaii	⊠4	1982
25975	610 x Mo17)3⊠4	Iowa	⊠5	1982
12910	610 x Mo17)3⊠5	Hawaii	⊠6	1983
15667	610 x Mo17)3⊠6	Iowa	⊠7	1983
5-826-5-868	Ex1006	Hawaii		1984
Puua Field	LH52	Hawaii		1985
West Amana	LH52	Iowa		1985
Home Farm	LH52	Iowa		1986
West Homestead	LH52	Iowa		1986

Exhibit A

The pedigree description of 'LH52' needs clarification in regard to the number of selfs. The first two generations were back crossed to Mo17. The third generation was selfed. The next seven generations were selfed in order, but the numbers in the nursery books are not correct. The selection numbers behind the pedigree in the nursery book substantiate the number of selfs.

Exhibit A

Uniformity Statement

I have observed 'LH52' for the first two generations of increase; Hawaii Kupa Field rows 5-826A through 5-868 and Hawaii Puua Field. In each of the increases seeds from the previous generations were planted. The line is very uniform, stable and free of variance from within the population.

Tom DeCourcy
Plant Breeder

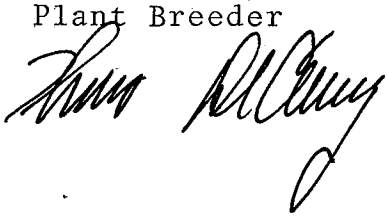


Exhibit A

Uniformity Statement

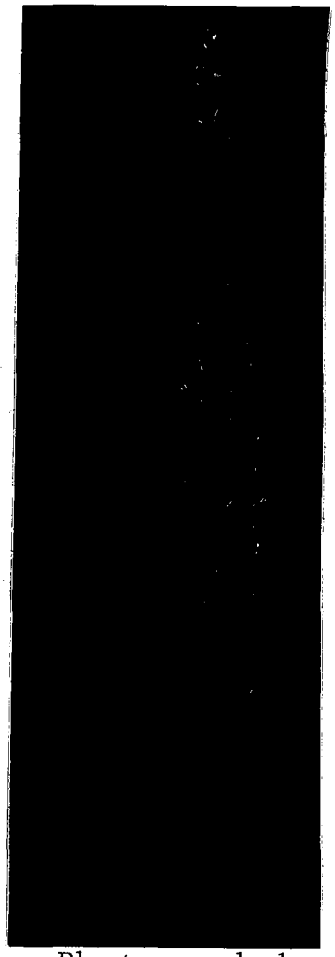
I have observed 'LH52' during the last two generations that it is increased, West Amana Field, Iowa 1985 and Home Farm and West Homestead, Iowa in 1986. In this increase seeds from the previous generation were planted. The line is very stable, uniform and free of variance from within the population.

Art Johnson
Plant Breeder

Exhibit B

Novelty Statement

'LH52' most closely resembles the corn inbred line 'Mo17Ht' however, the most distinguishing charactaristic is the tassel. 'LH52' has a tassel with very erect lateral branches. The tassel branch angle is less than 30^{o}. The lateral branch angle of the 'Mo17Ht' tassel is wider and not as erect. The lateral branch angle of 'Mo17Ht' is in the 30^{o}-40^{o} range.



Photograph 1

Pictured above is a tassel of 'LH52'. Notice the erect lateral branches and long center spike.

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-28
(2-15-74)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Corn)

OBJECTIVE DESCRIPTION OF VARIETY

CORN *(ZEA MAYS)*

NAME OF APPLICANT(S)
Holden's Foundation Seeds

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
R.R.#2, P.O. Box 839
Williamsburg, IA 52361

FOR OFFICIAL USE ONLY

PVPO NUMBER
8700020

VARIETY NAME OR TEMPORARY DESIGNATION
LH52

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. TYPE:

[2] 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNA. ,ENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

[7] 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how heat units were calculated)

[7][6] DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK — [1][3][3][0] HEAT UNITS

[0][0] DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY — [0][0][0][0] HEAT UNITS

[0][0] DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE — [0][0][0][0] HEAT UNITS

4. PLANT:

[1][7][2] CM. HEIGHT (To tassel tip) [0][7][3] CM. EAR HEIGHT (To base of top ear)

[1][1] CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

[1] 1 = NONE 2 = 1–2 3 = 2–3 4 = > 3

Number of Ears Per Stalk:

[1] 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

[1] 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify) _____

5. LEAF (Field Corn Inbred Examples Given):

Color: 7,5GY 3/4 Munssell Color Charts for Plant Tissues

[ ] 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K166)

Angle from Stalk (Upper half):

[1] 1 = < 30° 2 = 30–60° 3 = > 60°

Sheath Pubscence:

[1] 1 = LIGHT (W22) 2 = MEDIUM (WF9)
3 = HEAVY (OH26)

Marginal Waves:

[2] 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L)

Longitudinal Creases:

[3] 1 = ABSENT (OH51) 2 = FEW (OH56A)
3 = MANY (PA11)

Width:

[1][0] CM. WIDEST POINT OF EAR NODE LEAF

Length:

[0][5][8] CM. EAR NODE LEAF

[1][1] NUMBER OF LEAVES PER MATURE PLANT

6. TASSEL:

[0][3] NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

[1] 1 = < 30° 2 = 30–40° 3 = > 45°

Peduncle Length:

[0][3] CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

[2] 1 = LIGHT (WF9) 2 = MEDIUM 3 = HEAVY(KY21)

[1] **Anther Color:** 1 = YELLOW 2 = PINK 3 = RED 4 = PURPLE 5 = GREEN

[6] **Glume Color:** 6 = OTHER (Specify) green w/brown margin

Pollen Restoration for Cytoplasms (0 = Not Tested, 1 = Partial, 2 = Good)

[0] "T" [0] "S" [0] "C" [0] OTHER (Specify Cytoplasm and degrees of restoration) _____

7. EAR (Husked Ear Data Except When Stated Otherwise):

[1][5] CM LENGTH [3][3] MM. MID-POINT DIAMETER [7][2] GM. WEIGHT

Kernel Rows:

[2] 1 = INDISTINCT 2 = DISTINCT [1][0] NUMBER

[1] 1 = STRAIGHT 2 = SLIGHTLY CURVED 3 = SPIRAL

Silk Color (Exposed at Silking Stage):

[1] 1 = GREEN 2 = PINK 3 = SALMON 4 = RED

Husk Color:

[1] FRESH [6] DRY 1 = LIGHT GREEN 2 = DARK GREEN 3 = PINK 4 = RED 5 = PURPLE 6 = BUFF

Husk Extention: (Harvest Stage)

[2] 1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear) 3 = LONG (8–10CM Beyond Ear Tip) 4 = VERY LONG (> 10 CM)

Husk Leaf:

[1] 1 = SHORT (< 8 CM) 2 = MEDIUM (8–15 CM) 3 = LONG (> 15 CM)

Shank:

[1][3] CM LONG [5] NO. OF INTERNODES

Position at Dry Husk Stage:

[1] 1 = UPRIGHT 2 = HORIZONTAL 3 = PENDENT

Taper:

[2] 1 = SLIGHT 2 = AVERAGE 3 = EXTREME

Drying Time (Unhusked Ear):

[2] 1 = SLOW 2 = AVERAGE 3 = FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

[1][0] MM LONG [0][8] MM. WIDE [0][4] MM. THICK

Shape Grade (% Rounds)

[2] 1 = < 20 2 = 20–40 3 = 40–60 4 = 60–80 5 = > 80

8. KERNEL (Dried) :

[1] **Pericarp Color:** 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE
5 = BROWN 6 = LIGHT RED 7 = CHERRY RED
8 = VARIEGATED (Describe) _____

[1] **Aleurone Color:** 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) _____

[1] 1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED
7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) _____

[3] **Endosperm Color:** 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

[3] 1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH
5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) _____

[2][6] GM. WEIGHT /100 SEEDS (Unsized Sample)

9. COB:

[1][8] MM. DIAMETER AT MID-POINT

Strength:

[2] 1 = WEAK 2 = STRONG

Color:

[3] 1 = WHITE 2 = PINK 3 = RED 4 = BROWN
5 = VARIEGATED 6 OTHER (Specify) _____

10. DISEASE RESISTANCE (O = Not Tested, 1 = Susceptible, 2 = Resistant):

[0] STALK ROT (Diplodia)	[0] STALK ROT (Fusarium)	[0] STALK ROT (Gibberella)
[0] NORTHERN LEAF BLIGHT	[0] SOUTHERN LEAF BLIGHT	[0] SMUT
[0] SOUTHERN RUST	[0] CORN SMUT	[0] BACTERIAL WILT
[0] BACTERIAL LEAF BLIGHT	[0] MAIZE DWARF MOSAIC	[0] STUNT
[0] OTHER (Specify)		

11. INSECT RESISTANCT (O = Not Tested, 1 = Susceptible, 2 = Resistant):

[0] CORNBORER	[0] EARWORM	[0] SAPBEETLE	[0] APHID
[0] ROOTWORM (Northern)	[0] ROOTWORM (Western)		
[0] ROOTWORM (Southern)	[0] OTHER (Specify) _____		

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	A641Ht	Kernel Type	Mo17Ht
Plant Type	Mo17Ht	Quality (Edible)	
Ear Type	Mo17Ht	Usage	Mo17Ht

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.

Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous (Authors)

Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize. Cornell A.E.S., Mem. 180. 1935.

The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.

Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.

Butler, D.R. 1954 – A System for the Classification of Corn Inbred Lines – PhD. Thesis, Ohio State University.

COMMENTS:

Exhibit D

8700020

Additional Description of the Inbred

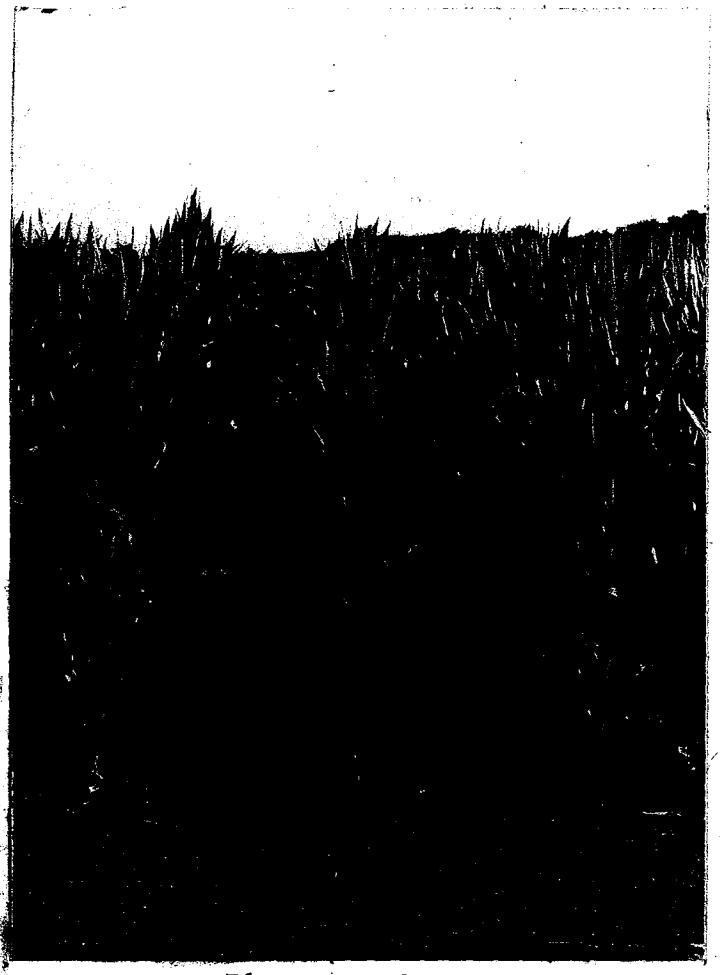
'LH52' has some other characteristics that distinguished it from 'Mo17Ht'. 'LH52' reaches anthesis sooner than 'Mo17Ht'. 'LH52' reaches mid pollen 6 days and mid silk 11 days earlier than 'Mo17Ht' when using heat units, 'LH52' reaches mid pollen and mid silk 145 and 263 heat units respectively earlier than 'Mo17Ht'. 'LH52' reaches mid pollen and mid silk at the same time or at least within a day of each other. 'Mo17Ht' reaches mid silk 5-7 days on the average after it reaches mid pollen.

'LH52' is darker green in color than 'Mo17Ht'. Using the Munsell Color Chart for Plant Tissues as a reference, 'LH52' would be classified as 7.5GY 3/4 while 'Mo17Ht' would be classified as 5GY 4/6.

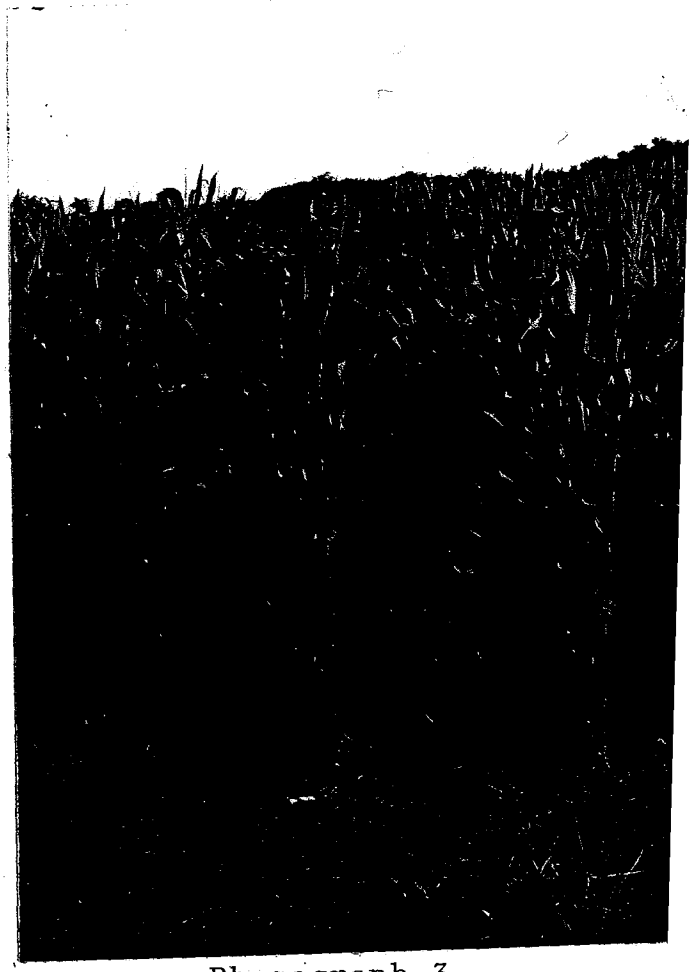
'LH52' has more longitudinal creases in the leaves than does 'Mo17Ht'. The creases are bigger and more distinct than those found on 'Mo17Ht'.

'LH52' has green silks and 'Mo17Ht' has salmon color silks.

The leaves of the 'LH52' plant are more upright and erect. The 'Mo17Ht' leaves are not as upright and tend to droop at the end of the leaves. This difference can be seen in the two photographs below.



Photograph 2
'LH52'



Photograph 3
'Mo17Ht'

Exhibit E

Statement of Applicant's Ownership

Holden's Foundation Seeds, Inc., Williamsburg, Iowa believes it is the sole owner and breeder of the 'LH52' field corn inbred for which it solicits a certificate of protection.